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EPA Superfund
Record of Decision:

NAVY SHIPS PARTS CONTROL CENTER
EPA ID: PA3170022104
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MECHANICSBURG, PA
09/30/1998

EPA 541-R98-148
<IMG SRC 981480>
<IMG SRC 98148A>

DECLARATION

SITE NAME AND LOCATION

Carter Road Landfill ("Site 1 " or "the site") is located at the Naval Inventory Control Point (NAVICP), formerly the Navy Ships Parts Control Center (SPCC) in Mechanicsburg, Pennsylvania.

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected action for Site 1 at NAVICP in Mechanicsburg, Pennsylvania, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site.

The Department of the Navy (DoN) and the U.S. Environmental Protection Agency (EPA) jointly selected the remedial action for Site 1. The Commonwealth of Pennsylvania, represented by the Pennsylvania Department of Environmental Protection (PADEP), concurs with the selected action.

ASSESSMENT OF THE SITE

Actual or threatened release of hazardous substances from this site, if not addressed by implementing the limited action as detailed in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Navy, PADEP, and EPA recommend that institutional controls be implemented at Site 1 since there is the potential for unacceptable risk to human health if the land use were to change to residential use.

Institutional controls will include the preparation of a site plat containing a note that residential use is prohibited within the boundaries of the site. The Navy will file a plat of the site containing a note describing the land use restriction with Northern Division's real estate division (Code 24) within 90 days of signing this ROD. NAVICP will also incorporate these restrictions and include the plat with any real property documents necessary for sale or lease in the unlikely event that the Navy transfers the property.
The real property document will also include a discussion of the National Priorities List (NPL) status of the site as well as a description of the contaminants of concern in soil.

Within 90 days of signing this ROD, the NAVICP installation commander shall prohibit residential use (i.e. houses, schools, nursing homes, recreational facilities, and other residential-style facilities) of the site by issuing an order or directive. The NAVICP installation commander shall be responsible for enforcing the prohibition on residential use.

The installation commander will provide annual certification to EPA and PADEP that there have been no violations of these restrictions by annual monitoring/inspection of the site. If a violation occurs, a description of the violation and corrective actions to be taken will be reported immediately to EPA and PADEP. As early as possible, but at least ninety days prior to an anticipated major land use change or property transfer (by sale or lease), EPA and PADEP will be notified.

STATUTORY DETERMINATIONS

<IMG SRC 98148B>

DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION

Site 1, Carter Road Landfill, is located at the Naval Inventory Control Point (NAVICP), formerly the Navy Ships Parts Control Center (SPCC) as shown in Figure 1. The NAVICP occupies approximately 824 acres in Hampden Township and the Borough of Mechanicsburg, Pennsylvania. Land usage encompasses open storage areas, buildings/warehouses, roads, railroads, and improved grounds.

Site 1 is currently a cleared, flat, grassy site, with no visual evidence of its past use as a disposal area (Figure 2). Three compacted aggregate pads cover most of the site. The total elevation change across the site is 5 ft with the high points along the railroad tracks, sloping to the northeastern area near the intersection of Ball and Carter roads. Soil at Site 1 is classifiod as Urban Land Hagerstown Complex.

The Preliminary Assessment (PA) (Fred C. Hart Associates 1984) identified the bedrock under Site 1 as a limestone belonging to the Rockdale, Run Formation. The aquifer underlying the site is unconfined (water table) and recharged by rainwater infiltration. Depth to the water table at Site 1 varies seasonally and is typically below the bedrock surface (EA 1990). The Mechanicsburg Water Company withdraws water from the aquifer at a well located approximately 3,500 ft from the southwest corner of the NAVICP, which is approximately 4,200 ft west of Site 1. Ground water enters Site 1 from the west and north and flows south and east to Cedar Run (Figure 3).

As there are no surface water bodies on the NAVICP, there are no aquatic ecosystems at or near Site 1.

Within the NAVICP, there is minimal naturally occurring vegetation due to the industrialized setting. Most of the existing vegetation (lawns, shrubs, trees) has been planted. Site 1 is a flat grassy area, only 4.5 acres in size, with limited habitat. Given the limited available habitat, documented wildlife on the NAVICP is minimal and can be classified as species typically found in urban settings. There are no known threatened or endangered species on the NAVICP (EA 1993).

The land use in the areas surrounding the NAVICP is mixed. To the north, along U.S. Route 11, there are industrial, recreational, commercial, and residential areas. To the east and southeast are primarily residential areas with some commercial areas, including a fuel storage area. To the west are industrial, residential, and recreational areas. Site 1 is located along the southwest boundary of the NAVICP. Use directly outside this boundary is industrial and/or commercial.

The Borough of Mechanicsburg is located immediately to the southwest of the NAVICP. Mechanicsburg has a population of approximately 9,452 residents.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Site 1 is a former disposal area located along the installation's southwest boundary. According to the Preliminary Assessment (PA) Report (Fred C. Hart Associates 1984), the site was used from 1950 to 1962 for the disposal of construction rubble and some medical supplies (dextrose and glucose solutions) and gas mask canisters. Now the site is a flat, cleared area covered with grass, compacted aggregate and bituminous pavement. It is currently used for temporary storage. The NAVICP Master Plan identifies future land use at Site 1 as temporary storage.

The Installation Restoration (IR) program at NAVICP began in 1984 when the Navy completed an Installation Assessment Study (IAS), which is equivalent to a PA under CERCLA. The IAS (PA) was done to obtain existing information regarding potential waste disposal sites and determine whether additional action was required. In response to the Superfund Amendments and Reauthorization Act (SARA), the IR Program was reformulated to be consistent with the CERCLA/SARA format and evaluation of NAVICP continued under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The PA recommended that a Site Inspection (SI) be performed at Site 1. Plans to conduct the SI were completed in Spring 1989. SI studies at Site 1 were completed in October 1990 and a Remedial Investigation (RI) was recommended. The Phase I RI Report was completed in March 1993 (EA 1993). SPCC (now NAVICP) was placed on the National Priorities List (NPL) on May 31, 1994, which led to a re-evaluation of Site 1 data prior to the issuance of the Proposed Plan. The Proposed Plan was issued in August 1998.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

A public meeting was held at the Hampden Township Building in Mechanicsburg, Pennsylvania on September 2, 1998. The Proposed Plan and Administrative Record were made available for public review at the Mechanicsburg Area Public Library and at the NAVICP-Mechanicsburg, Pennsylvania. The opportunity to submit oral and/or written comments was made available at the public meeting. Additionally, written comments could be submitted

to NAVICP. The 30-day public comment period was from August 17, 1998 to September 15, 1998. These activities comply with the public participation requirements of CERCLA sections 11 3(k)(2)(B)(I-v) and 117. No comments were received during the public comment period or public meeting.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

This ROD documents the selected remedy for ground water, surface soil, and subsurface soil at Site 1. The selected remedy for Site 1 is institutional controls. Site 1 is one component of a comprehensive environmental investigation and cleanup being performed under the IR Program at NAVICP. Protectiveness of this action will be evaluated during the 5-year review process.

Although the RI identified contamination in one ground-water sampling location, Site 1 does not appear to be the source of contamination. A separate investigation will attempt to find the source, if it exists on NAVICP property.

SITE CHARACTERISTICS

KNOWN SOURCES OF CONTAMINATION

Sampling of the subsurface soil and ground water was completed as part of the SI and the RI. No surface water or sediment exists at Site 1 and the surface soil is comprised of clean fill. These media are not expected to pose unacceptable risks to human health or the environment and were therefore not evaluated in the human health risk assessment or the ecological risk screening.

SUBSURFACE SOIL

Twenty test borings, were completed during the SI (EA 1990), with a total of 35 samples submitted for laboratory analyses (Figure 4). Four metals (antimony, arsenic, cadmium, and beryllium) were found to be elevated (with respect to published background values) in the subsurface soil at Site 1. Several semivolatile organic compounds (SVOC), pesticides, and polychlorinated biphenyls (PCB) were detected in soil samples. Trichloroethene (TCE) was detected in one subsurface soil sample.

During the RI, two test pit excavations were completed at the two SI boring locations where waste fill was identified (Figure 4) and six samples were collected and submitted to the laboratory to obtain additional subsurface soil data. Volatile organic compounds (VOC), SVOC, pesticides and PCB were detected in subsurface soil. Virtually all metals tested for were detected in the waste/fill samples at concentrations above background levels for soil. VOC found in subsurface soil include TCE and benzene. TCE levels ranged up to 10 parts per billion (ppb); only trace levels of benzene (4 ppb) were detected in waste/fill samples.

GROUND WATER

During the SI, four of the test borings were advanced below the overburden/bedrock to a depth of approximately 40 ft below grade and completed as monitoring wells (Figure 4). Ground-water-flow direction within Site 1 appears to be east-southeast. The wells were sampled three times for the SI and once for the RI. Results for the SI sampling are summarized in Table 1 and results for the RI sampling are summarized in Table 2.

TABLE 1. SITE INSPECTION INVESTIGATION, SUMMARY OF WELLS EXCEEDING MCLs

Contaminant of Potential Concern (COPC)	Total Samples	Well	MCL (a) (ppb)	Concentration (ppb)	Number of Exceedances (b)
Trichloroethene (TCE)	12	S01M03	5	5.3/8.1	2
Benzene	12	S01M01	4.5	21	1
Beryllium	12	S01M02/S01M04	4	4.1*/4.5	2
Nickel	12	S01M01	100	142	1
Chromium	12	S01M01	100	102	1

S01M01 - upgradient well
* Filtered sample (dissolved)
Metal concentrations are unfiltered (total) unless noted
(a) Maximum Contaminant Level (MCL).
(b) Sample concentration above MCL.

TABLE 2. REMEDIAL INVESTIGATION, SUMMARY OF WELLS EXCEEDING MCLS

COPC	Total Samples	Well	MCL (a) (ppb)	Concentration (ppb)	Number of Exceedances (b)
Benzene	4	S01MO3	5	20	1
Trichoroethene (TCE)	4	S01MO3	5	4	0
Bis(2-ethylhexyl)phthalate (BEHP)	4	S01MO4	6	29	1
Cadmium	4	S01M02	5	11.2	1
Beryllium	4	S01M02	4	1.9	0
Lead	4	S01M01/S01M02	*5	17.6/24.2	2

* Denotes PADEP Action Level
Metal concentrations are unfiltered (total) unless noted
(a) Maximum Contaminant Level (MCL).
(b) Sample concentration above MCL.

The SI samples were consistent in detecting TCE in well S01M03, with two of the three samples above the 5 ppb drinking water maximum contaminant level (MCL). TCE was not detected in the upgradient well or any other Site 1 water sample. Benzene was detected in one sample (S01M03) at 21 ppb, which exceeds the MCL (5 ppb), in round one, but not in subsequent rounds. Benzene was not detected in the upgradient well or in the subsurface soil samples. No other organic compounds were found to exceed an MCL in ground water.

Beryllium, nickel, and chromium were found at levels exceeding their respective MCLs (Table 1).

Bromodichloromethane and chloroform, at concentrations ranging from 1 to 10 ppb, were detected in a few ground-water samples. These compounds, which are typically found in chlorinated water, were also present in the source water for drilling operations and cleaning of sampling gear.

The RI ground-water sample from S01M03 was reported to contain 20 ppb benzene and 4 ppb TCE. PCB were not detected. One pesticide (endosulfan at 0.5 ppb) was reported in one sample (S01M02). SVOC were reported in two samples. Bis(2-ethylhexyl)phthalate (MCL = 6 ppb) was reported in the S01M04 sample (29 ppb). Acenaphthene (6 ppb) and naphthalene (6 ppb) were reported in the S01M03 sample.

No dissolved metal concentration was found to exceed an MCL in ground-water samples. Four total metal values were reported to exceed the MCL for cadmium (5 ppb) or the PADEP action level for lead (5 ppb). These were cadmium in the S01M02 (11.2 ppb) sample and lead in the S01M01 (17.6 ppb), S01M02 (24.2 ppb), and S01M04 (6.6 ppb) samples.

SUMMARY OF SITE CHARACTERISTICS

The source of the TCE found in ground water during the SI sampling could not be determined. Subsurface soil was not a likely source as TCE was detected in only one sample (S01B07-06), which did not appear to be located upgradient of S01M03. VOC detected during the RI in both waste/fill subsurface samples and ground-water samples include TCE and benzene. TCE levels in the waste/fill sample ranged up to 10 ppb and in the ground-water sample from S01M03 was 4 ppb. For benzene, only trace levels (4 ppb) were detected in the waste/fill subsurface samples. Benzene was reported to be 20 ppb in the ground-water sample from S01 M03. PCB and pesticides identified in the RI waste/fill subsurface samples were not reported in the RI ground-water samples. One pesticide reported in one sample of ground water was not found in the waste/fill subsurface samples.

On the basis of data obtained during the SI and RI, presented above, there is no firmly established cause and effect relationship between the subsurface material at Site 1 (including the waste/fill samples collected during the RI) and the quality of ground water downgradient of Site 1. That is, the TCE and benzene do not originate from Site 1.

TCE levels in the downgradient monitoring well may have resulted from the source at Site 3 (Figure 4), as suggested by the results of the ground-water tracing study (EA 1993). The source of benzene in the ground water is unknown. The source(s) will be further evaluated during separate investigations.

SUMMARY OF SITE RISKS

To evaluate risks to human health and the environment, several reports were prepared: a human health risk assessment (EA 1994), an addendum to the human health risk assessment (EA 1997), a memo responding to EPA comments on the human health risk assessment and addendum (U.S. Navy 1997a) and an ecological risk screening (U.S. Navy 1997b).

HUMAN HEALTH RISK ANALYSIS

The scope of the human health risk assessment was limited to the analysis of potential risks for ground water and subsurface soil. This decision was based on the fact that there is no surface water or sediment at Site 1, and the surface soil is clean fill.

Ground Water Human Health Risk Analysis

Data from analyses of ground-water samples were used to quantify risks to humans posed by contaminants of potential concern (COPC) in four classes at Site 1: VOC, SVOC, pesticides and PCB, and inorganic analyses, mostly metals. At least one analyte in each of these four groups was detected in ground-water samples from Site 1. A list of COPC in ground-water samples at Site 1 was developed using U.S. EPA Region III's Risk-Based Concentrations (RBCs). The final list of COPC developed included 22 analytes (Table 3) (EA 1997).

The purpose of an exposure assessment is to determine the populations that potentially may be exposed to site-related COPC, the pathways by which exposure may occur, and the magnitude, frequency, and duration of these potential human exposures.

Mechanicsburg and the NAVICP both are served by a public water supply. In addition, one privately owned well exists near the NAVICP boundary south of Site 1. This well, at an auto sales facility, is not used as a source of drinking water. Another privately owned well in the vicinity, which was used for irrigation at a Garden Center, was destroyed during demolition of the Garden Center.

The continuing use of the site is open-air storage of industrial equipment. It is extremely unlikely that the area will ever become residential property. However, the default exposure assumptions of a residential exposure scenario were used to assess the ground water at Site 1 because this scenario includes the highest intake of water and the greatest amount of direct contact and is, therefore, a conservative scenario. If risk under this scenario is acceptable, then other scenarios with less potential for exposure will also result in risk estimates which are acceptable. A residential exposure scenario includes exposure of adults to ground water via ingestion, dermal contact when showering, and inhalation of volatile compounds when showering. Considering the current and planned uses at Site 1, described above, there is little to no chance of human contact with ground water. However, in order to assess the potential risk from ground water, a conservative approach was adopted and a residential scenario was assumed.

TABLE 3. CONTAMINANTS OF POTENTIAL CONCERN (COPC) IN GROUND WATER FOR SITE 1 (CARTER ROAD LANDFILL), SCREENED FOR FUTURE RESIDENTS

Analyte	Max. Conc. (Ig/L)	Risk-Based Conc. (Ig/L)		Max> RBC?	Frequency of Detection	Frequency of Detection >5%?	Additional Considerations	COPC ?
SEMIVOLATILE ORGANIC COMPOUNDS								
Bis(2-ethylhexyl)phthalate	29	4.8	C	Yes	10/16	Yes		YES
VOLATILE ORGANIC COMPOUNDS								
Benzene	20.6	0.36	C	Yes	2/16	Yes		YES
Bromodichloromethane	3.34	0.17	C	Yes	1/16	Yes		YES
Chloroform	9.97	0.15	C	Yes	2/16	Yes		YES
Trichloroethene (TCE)	7.22	1.6	C	Yes	4/16	Yes		YES
INORGANIC ANALYTES (Dissolved)								
Beryllium	4.1	0.016	C	Yes	2/16	Yes		YES
Copper	151	1,500	N	Yes	13/16	Yes	>1/10th RBC	YES
Manganese	120	840	N	Yes	4/16	Yes	>1/10th RBC	YES
Thallium (1)	1.4	2.9	N	Yes	3/14	Yes	>1/10th RBC	YES
INORGANIC ANALYTES (Total)								
Aluminum	57,100	37,OOO	N	Yes	11/15	Yes		YES
Arsenic	6.9	11	N	Yes	4/16	Yes		YES
		0.045	C					
Barium	377	2,600	N	Yes	12/12	Yes	>1/10th RBC	YES
Beryllium	4.5	0.016	C	Yes	6/16	Yes		YES
Cadmium	11.2	18	N	Yes	3/16	Yes	>1/10th RBC	YES
Chromium (2)	102	180	N	Yes	7/16	Yes	>1/10th RBC	YES
Copper	158	1,500	N	Yes	9/13	Yes	>1/10th RBC	YES
Lead (3)	24.2	15		Yes	4/13	Yes		YES
Manganese	1,300	840	N	Yes	13/14	Yes		YES
Nickel	142	730	N	Yes	8/16	Yes	>1/10th RBC	YES
Silver	25.1	180	N	Yes	1/13	Yes	>1/10th RBC	YES
Thallium	1.6	2.9	N	Yes	5/15	Yes	>1/10th RBC	YES
Vanadium	104	260	N	Yes	5/16	Yes	>1/10th RBC	YES

C Risk-Based Concentration is based on cancer effects.
N Risk-Based Concentration is based on noncancer effects.
ND Not detected.
(1) RBC for thallium carbonate, thallium chloride, or thallium sulfate (the more toxic thallium compounds) was used for thallium.
(2) RBC for hexavalent chromium, the most toxic form of chromium, was used.
(3) Safe Drinking Water Act Action Level of 15 Ig/L was used to screen lead in ground water.
(4) Comparison for non-carcinogens is to one-tenth the RBC.

It is necessary to know the concentrations of COPC in each medium in order to estimate potential human intake. Concentrations from the four rounds of samples taken of the four monitoring wells installed at Site 1 were used to estimate the concentrations hypothetical future residents may encounter in their domestic water supply. In this risk assessment, the concentrations in ground water were measured directly, but concentrations of volatilized compounds in air during showering were modeled from measured ground-water concentrations (see EA 1994, Appendix A).

Future adult residents were assumed to weigh 70 kg, have a body surface area of 20,000 CM 2 , reside in one location for 30 years, and be present at this location for 350 days per year of residence. They were assumed to ingest 2L/day of drinking water, shower once per day for 12 minutes (0.2 hr), and inhale at a rate of 0.6 m 3/hr while showering. Averaging time was assumed to be 30 years to assess noncarcinogenic effects and 70 years to assess carcinogenic effects. Risk from dermal contact and inhalation of volatilized compounds while showering was assumed to substantially overshadow risk from other opportunities for dermal contact and inhalation of volatilized compounds, so exposure while showering was the only source of exposure considered for the dermal and inhalation exposure pathways (EA 1994, 1997).

Characterization of Cancer and Noncancer Risks

Excess lifetime cancer risks: When excess cancer risks are based on dissolved concentrations for inorganic analyses, the total cancer risk is 8 x 10 -5 (incidence of cancer is predicted at eight additional cases per 100,000 people exposed). When risks are based on total concentrations for inorganic analyses, the total excess lifetime cancer risk is 2 x 10 -4. For total analyte concentration, this cancer risk is attributable to ingestion of beryllium (1 x 10 -4) and arsenic (5 x 10 -5) in ground water.

The interpretation of the significance of this cancer risk estimate is based on the appropriate EPA guidance (U.S. EPA 1990).

> For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10 -4 and 10 -6.

Therefore, on the basis of EPA standards, no excess lifetime cancer risks, using dissolved analyte concentrations, are anticipated for future adult residents. However, excess lifetime cancer risk using total analyte concentrations slightly exceeds the acceptable range.

The U.S. Navy, PADEP, and EPA have determined that organic and inorganic contaminants in ground water at Site 1 do not pose an unacceptable risk to human health or the environment. Excess lifetime cancer risk (2 x 10 -4) for future residential use of Site 1 slightly exceeded the acceptable range when total concentrations were used. Most of this excess lifetime cancer risk is attributable to beryllium and is likely to be overestimated (EA 1997). Cancer potency estimates for beryllium are likely to be overestimated due to the use of a 1976 cancer study for estimation of oral risk. The cancer hazard characterization and dose-response assessment of beryllium is currently being re-evaluated as part of U.S. EPA's cancer risk assessment reassessment program.

This analysis is consistent with EPA guidance on risk assessment at Superfund sites. See Role of the Baseline Risk Assessment in Superfund Decisions in OSWER Directive 9355.0-30 (April 22, 1991) wherein, "The boundary of the risk range is not a discrete line at 1 x 10 -4.... A specific risk estimate around 10 -4 may be considered acceptable if justified based on site specific conditions."

Noncancer risks: Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. Reference doses (RfDs) have been developed by EPA for indicating the potential adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

The hazard index (HI), combining individual hazard quotients (HQ) for noncancer effects for each COPC, is 0.6, using dissolved analyte concentrations. Because the HI is less than 1.0, no adverse noncancer effects are anticipated to occur under the specified conditions of exposure to ground water. However, when noncancer

risks are estimating using total analyte concentrations, the HI is 3.0. Most of this HI is attributable to ground-mrater exposure via ingestion, not via dermal contact or inhalation. When the HI is equal to or greater than one, there is concern for potential adverse health effects, and toxicological evaluation of the likelihood of additivity (compounding effects on target organs) of adverse health effects other than cancer is warranted (U.S. EPA 1989a). The COPC contributing most to the total HI are: manganese (HQ = 0.9), alurninum (HQ = 0-6), thallium (HQ = 0.4), arsenic (HQ = 0.2), cadmium (HQ = 0.2), and chromium (HQ = 0.2). Based on target organs which may be affected, additivity is not anticipated for any of these COPC. The target organs of aluminum, arsenic, and cadmium noncancer toxicity are gastrointestinal tract, kidney, and skin, respectively. Neither chromium nor cadmium exhibit any systemic toxicity; regulatory toxicity values for these metals are based solely on the highest dose tested in animal experiments. Therefore, under the specified conditions of exposure, adverse noncancer health
effects are not anticipated for future residents.

Subsurface Soil Human Health Risk Analysis

Potential human health risks associated with exposure to subsurface soil were evaluated. Comparing subsurface soil data with appropriate risk-based concentrations indicates that potential risks to commercial/industrial and construction workers at Site 1 are within acceptable limits (U.S. Navy 1997a).

For future residents, the calculated risk of excess cancers from incidental ingestion of subsurface soil is approximately 1.0 x 10 -4, due to arsenic. The risk calculation for the residential scenario is at the precise upper bound of U.S. EPA's target range for managing cancer risks (10 -4 to 10 -6). For noncancer risks, the calculated value of 1.7 for arsenic is marginally greater than the benchmark of <1.

A qualitative evaluation of RI test pit soil sample data revealed that PCB were detected at up to 33 mg/kg. Given the maximum detection, this roughly translates to an excess cancer risk in the high 10 -5 to low 10 -4 range for residential receptors assuming the contaminated soil is available for direct contact. Several metals were observed in excess of residential risk-based concentrations: antimony (up to 500 mg/kg-which is not supported, however, by the duplicate sample), arsenic (up to 35 mg/kg), lead (up to 14,300 mg/kg), and manganese (up to 12,000 mg/kg). If residential risks were calculated for antimony, arsenic, and manganese, each would likely have an HQ greater than 1. Also for arsenic, the incremental cancer risk would be in the mid to high 10 -5 range. For lead, 400 mg/kg is the EPA screening level for residential soil.

For the foregoing reasons, subsurface soil at Site 1 could be a human health concern to future residents should the land use change from its current industrial usage to residential usage.

ECOLOGICAL RISK SCREENING

The environment at Site 1 is dominated by three rectangular compacted aggregate pads (Figure 2), originally constructed in the late 1980s as foundations for storage structures. Part of this construction was the placement of clean fill over the existing surface soil. The habitat is limited to sparse grass growth on the pads and dense grass ground cover in the swales between the three pads and on the periphery of the site. A series of evergreens lines the northeast border along Ball Road. Potential receptors at
the site include groundhog, ground-feeding robins, cowbirds and grackles.

An ecological risk screening of Site 1 data was conducted in accordance with U.S. EPA Regional guidance. The conceptual she model for Site 1 identifies the primary exposure source to be soil. Because the surface soil is clean fill, ecological screening was conducted on the shallow subsurface soil. An analyte is considered to be a COPC if the Maximum concentration exceeds the screening value, that is if the Environmental Effects Quotient (EEQ) is greater than 1 (EEQ=maximum concentration/screening value). Of the organic compounds, fluoranthene, phenanthrene, and pyrene had EEQs greater than 1 (Table 4). These were all less than 2 and occurred in the same sample (S01B08-02). One PCB, Aroclor-1260, had an EEQ greater than 10 (Table 4). A food uptake model was run and the resulting hazard quotient was less than 1, indicating that risk is minimal (U.S. Navy 1997b). While several metals had EEQs greater than 1, they
were generally less than 10 indicating only a small potential for environmental effects. In these cases the actual data were usually near the detection limit and were qualified as estimates. Only EEQs for lead (10.84), mercury (33.0), and zinc (28.8) were greater than 10; these EEQs all occurred at sample location, S01B05 (U.S. Navy 1997b).

Evaluation of Site 1 data reveals that the habitat is limited to sparse grassy areas. The data indicate that incidences of EEQs greater than 7 occur at only 2 sampling locations out of 20. Furthermore, the bioavailability of the COPC is limited because there is 1 to 2 ft of clean fill over the landfilled material. The Navy, EPA, and PADEP have agreed, based on overall weight of evidence, that there are no potential ecological risks which warrant remedial action.

TABLE 4. ECOLOGICAL SCREENING OF CONTAMINANTS OF POTENTIAL CONCERN (COPC) IN SUBSURFACE SOIL FOR SITE 1 (CARTER ROAD LANDFILL)

Analyte	Detected Max	Units	Screen Value	NAVICP Subsurface Soil Background	Screening Level Source	EEQ	COPC? (1)	Maximum Exceeds NAVICP Background
METALS								
Aluminum	37,400	mg/kg	NC		NC	NC	NC	
Antimony	13.6	mg/kg	5	17.82	Will and Suter 1995	2.72	(8)	no
Arsenic	173	mg/kg	42	25.64	Dutch 1994 (mean)	4.12	(4)	yes
Barium	196	mg/kg	412.5		Dutch 1994 (mean)	0.48		
Beryllium	3.9	mg/kg	10	8.95	Will and Suter 1995	0.39		no
Cadmium	26.1	mg/kg	3	7.2	Will and Suter 1995	8.70	(1)	yes
Calcium	226,000	mg/kg	NC		NC	NC	NC	
Chromium	58.7	mg/kg	10	67.55	Oak Ridge 1996	5.87	(16)	no
Cobalt	18.9	mg/kg	130		Dutch 1994 (mean)	0.15		
Copper	406	mg/kg	100	59.25	Will and Suter 1995	4.06	(1)	yes
Iron	60,300	mg/kg	NC		NC	NC	NC	
Lead	542	mg/kg	50	133.31	Oak Ridge 1996	10.84	(5)	yes
Magnesium	18,100	mg/kg	NC		NC	NC	NC	
Manganese	2,290	mg/kg	330		BTAG 1995	6.94	(12)	
Mercury	3.3	mg/kg	0.1	0.27	Oak Ridge 1996 (earthworm)	33.00	(10)	yes
Nickel	28.2	mg/kg	30	56.25	Will and Suter 1995	0.94		no
Potassium	2,070	mg/kg	NC		NC	NC	NC	
Selenium	2	mg/kg	1		Will and Suter 1995	2.00	(4)	
Silver	4.5	mg/kg	2	6.11	Oak Ridge 1996 (plant)	2.25	(1)	no
Sodium	233	mg/kg	NC		NC	NC	NC	
Thallium	10.7	mg/kg	1	0.9	Oak Ridge 1996 (plant)			

Analyte	Detected Max	Units	NAVICP Screen Value	Subsurface Soil Background	Screening Level Source	EEQ	COPC? (1)	Maximum Exceeds NAVICP Background?
Vanadium	70.8	mg/kg	20		Oak Ridge 1996 (earthworm)	3.54	(12)	
Zinc	1,440	mg/kg	50	221.63	Oak Ridge (plant)	28.80	(13)	yes
PCB								
Aroclor-1260	4,300	ıg/kg	51		Dutch 1994 (mean)	84.31		yes
PAH								
Acenaphthene	240	ıg/kg	2,050		Dutch 1994 (mean)	0.12		
Acenapthylene	100	ıg/kg	2,050		Dutch 1994 (mean)	0.05		
Anthracene	660	ıg/kg	2,050		Dutch 1994 (mean)	0.32		
Benz(a)anthracene	1,400	ıg/kg	2,050		Dutch 1994 (mean)	0.68		
Benzo(a)pyrene	1,200	ıg/kg	2,050		Dutch 1994 (mean)	0.59		
Benzo(b)fluoranthene	980	ıg/kg	2,050		Dutch 1994 (mean)	0.48		
Benzo(g,h,i)perylene	870	ıg/kg	2,050		Dutch 1994 (mean)	0.42		
Benzo(k)fluoranthene	1,000	ıg/kg	2,050		Dutch 1994 (mean)	0.49		
Chrysene	1,400	ıg/kg	2,050		Dutch 1994 (mean)	0.68		
Dibenz(a,h)anthracene	370	ıg/kg	2,050		Dutch 1994 (mean)	0.18		
Fluoranthene	3,200	ıg/kg	2,050		Dutch 1994 (mean)	1.56	(1)	
Fluorene	310	ıg/kg	2,050		Dutch 1994 (mean)	0.15		
Indeno(1,2,3-cd)pyrene	770	ıg/kg	2,050		Dutch 1994 (mean)	0.38		
Naphthalene	920	ıg/kg	2,050		Dutch 1994 (mean)	0.45		
Phenanthrene	3,200	ıg/kg	2,050		Dutch 1994 (mean)	1.56	(1)	
Pyrene	3,400	ıg/kg	2,050		Dutch 1994 (mean)	1.66	(1)	
Total PAH (detects)	19,131	ıg/kg	4,000			4.78	(4)	
SVOC								
2-Methylnaphthalene	1,100	ıg/kg	2,050		Dutch 1994 (Naphthalene surrogate)	0.54		
4-Methylphenol	210	ıg/kg	1,000		Quebec 1988	0.21		

Analyte	Detected Max	Units	Screen Value	NAVICP Subsurface Soil Background	Screening Level Source	EEQ	COPC? (1)	Maximum Exceeds NAVICP Background?
Di-n-butylphthalate	52	ıg/kg	3,005		Dutch 1994 (mean)	0.02		
Di-n-octyl phthalate	2,600	ıg/kg	3,005		Dutch 1994 (mean)	0.87		
Dibenzofuran	250	ıg/kg	NC		NC	NC	NC	
Diethyl phthalate	39	ıg/kg	3,005		Dutch 1994 (mean)	0.01		
N-Nitrosodiphenylamine	54	ıg/kg	20,000		Oak Ridge 1996 (earthworm)	0.00		
Bis(2-ethylhexyl)phthalate	23,000	ıg/kg	3,005		Dutch 1994 (mean)	7.65	(1)	

NC = No screening level available.
(1) The number in the COPC column is the number of detections in soil samples at concentrations greater than the Environmental Effects Quotient (EEQ). If a value is shown, the parameter is a COPC.

DESCRIPTION OF ALTERNATIVES

Three alternatives were considered in the Focused Feasibility Study for Site 1 soil (EA 1998). First, a "No Action" alternative was considered as required by the NCP. The FFS also included an evaluation of institutional controls (land use restrictions) and site remediation through soil excavation and disposal.

Alternative No. 1: No Action

Present Worth Cost: $15,400 (Net present worth of estimated administrative cost of 5-year review of remedial action over a 30-year period)
Time to Implement: 0

The NCP requires that a "No Action" alternative be considered to establish a baseline or reference point against which each of the alternatives can be compared. In the event that the other identified alternatives do not offer substantial benefits in the reduction of toxicity, mobility, or volume of the COPC, the "No Action" alternative may be considered a feasible approach. This alternative leaves the subsufface fill and debris undisturbed. Potential future risks to potential future residents would remain.

Alternative No. 2: Institutional Controls

Present Worth Cost: $23,250 (Estimated administrative cost associated with preparation of deed notice, annual monitoring and certification over a 30-year period, and 5-year review of remedial action over a 30-year period)
Time to Implement: Within 90 days of signed ROD

This alternative will prohibit the use of the property for residential (i.e. houses, schools, nursing homes, recreational facilities, and other residential-style facilities) purposes. Within 90 days of signing this ROD, the Navy will send a plat of the site containing a note describing the land use restriction to the Northern Division's real estate division (Code 24) and a request to document the institutional controls (i.e. residential restrictions) on the NAVICP summary map. In addition, NAVICP will incorporate these restrictions and include the plat with any real property documents necessary for transferring property interests, in the unlikely event that the Navy transfers any part of the site by sale or lease. The real property document will also include a discussion of the NPL status of the she as well as a description of the contaminants of concern in soil.

Within 90 days of signing this ROD, the NAVICP installation commander shall prohibit residential use (i.e. houses, schools, nursing homes, recreational facilities, and other residential-style facilities) of the site by issuing an order or directive. The NAVICP installation commander shall be responsible for enforcing the prohibition on residential use. A copy of the site plat will be kept on file with the NAVICP Public Works Department.

NAVICP shall conduct annual field inspections of the site to determine whether current land use remains protective and consistent with the restrictions on residential use selected in this ROD. The installation commander shall certify continued compliance with the residential use restriction in an annual report to the Chief of the Federal Facilities Branch, Hazardous Site Cleanup Division at the EPA and the Chief of the Hazardous Sites Cleanup Section, Environmental Cleanup Program at PADEP. If a violation occurs, a description of the violation and corrective actions to be taken will be reported immediately to EPA and PADEP.

NAVICP shall give notice to EPA and PADEP, and obtain their written concurrence, whenever NAVICP anticipates a "major change in land use" (defined below) at the site. The facility should notify the regulatory agencies as soon as a major land use change is anticipated in order to allow sufficient time for regulatory review and amendments to remedy selection documents, such as this ROD. Such notifications should be made to the regulatory agencies at least 90 days prior to a major change in land use and shall include:

(a) an evaluation of whether the anticipated land use change will pose unacceptable risks to human health or environment or negatively impact the effectiveness of the remedy,

(b) an evaluation of the need for any additional remedial action resulting from the anticipated land use changes, and

(c) a proposal for any necessary changes to the selected remedial action, and identification of procedural requirements for the proposed changes (e.g., amending this ROD).

NAVICP shall notify EPA and PADEP immediately upon discovery of any unauthorized major change in land use at the site.

NAVICP shall give advance (at least 90 days) notice to EPA and PADEP in the event NAVICP contemplates transfer, by sale or lease, of any portion of the site.

For purposes of this ROD, the following are considered "major changes in land use":

a. A change in land use that is inconsistent with the exposure assumptions in the risk assessment that is the basis for the land use control objectives above (either human health or ecological risk assessment). Any change from industrial or commercial land use to a more sensitive land use, such as housing, schools, hospitals, day care centers or recreational land is a major change in land use. Any change in land use that has been prohibited in order to protect the environment is also a major change in land use.

b. Any action that may disrupt the effectiveness of the remedial action.

c. Any other action that might alter or negate the need for land use controls. An example is any plan to actively remediate any part of the site in order to allow unrestricted use.

This alternative addresses the exposure pathway by preventing residential use. This alternative seeks to establish procedures for the future prevention of risk.

Alternative No. 3: Site Remediation (Soil Excavation and Disposal)

Present Worth Cost: $178,000
Time to Implement: 6 months

Under this alternative, subsurface waste fill would be excavated and transported offsite for subsequent disposal at a licensed residual waste facility. Following excavation and removal of approximately 1,750 yd 3 of waste fill, the excavation would be backfilled with clean soil. This procedure eliminates the exposure pathway, thereby eliminating the risk.

SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Each of the three (3) alternatives summarized in the FFS have been evaluated with respect to the nine (9) evaluation criteria set forth in the NCP, Title 40 Code of Federal Regulations (CFR) Section 300.430(e)(9). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria.

THRESHOLD CRITERIA

Overall Protection of Human Health and the Environment

A primary requirement of a selected alternative is to be protective of human health and the environment. A remedy is protective if it reduces current and potential risks posed by each exposure pathway at the site to acceptable levels.

Alternative No. 1 (No Action) would not effectively reduce future risk to human health at Site 1 because it would allow unrestricted future use of the land. Potential future residents on the site could possibly be exposed to unacceptable human health risks if exposed to subsurface soil. Because this alternative does not meet the threshold criteria of protection of human health and the environment, it will not be considered further in this analysis.

Alternative Nos. 2 and 3 are protective of human health and the environment. Both alternatives reduce the potential for exposure to site contaminants, but each does so in a different way.

Alternative No. 2 prohibits residential use of the site as it presently exists. In addition,

the installation commander of NAVICP will provide annual certification to EPA and

PADEP that there have been no violations of these restrictions by annual monitoring/inspection of the site.

Alternative No. 3 removes the contaminated soil and debris and backfills the area with clean soil.

Although Alternative Nos. 2 and 3 are both effective in protecting human health and the environment, each involves different trade-offs as to other factors such as implementability and cost which are discussed below.

Compliance With Applicable or Relevant and Appropriate Requirements

Alternative No. 2 (Institutional Controls) will ensure that human health risks from the site are kept within acceptable limits (e.g., excess cancer risk between 10 -06 and 10 -04 and HI less than or equal to 1.0). This alternative will comply with Federal and State requirements that are legally applicable or relevant and appropriate.

Although not the selected remedy, the action associated with Alternative No. 3 would comply with the ARARs presented in the FFS (EA 1998).

PRIMARY BALANCING CRITERIA

Long-Term Effectiveness and Performance

Alternative No. 2 does not remove the contaminated soil at the site. Effectiveness and permanence is based on preventing residential exposure to the subsurface material. In addition, annual inspection and certification to the U.S. EPA and PADEP will ensure that these restrictions are not violated. If a violation has occurred, a description of the violation and corrective actions to be taken will be provided. These safeguards are what guarantee that the restrictions will be effective in the long-term.

Alternative No. 3 provides a more permanent and effective long-term remedy by removing impacted soil from the site. Alternative No. 3 removes all impacted soil, fill, and debris from the site, thereby eliminating the possibility of any risks to future residential users at the site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Section 121.(b) of CERCLA, 42 U.S. Code (U.S.C.) Section 9621 (b), and 40 CFR Section 300.430(e)(a)(iii)(D) establish a preference for remedial actions which include treatment that permanently and significantly reduces the toxicity, mobility, or volume of contaminants.

The contaminants at Site 1 were found to be relatively immobile and not migrating away from the site in ground water. Alternative Nos. 2 and 3 would not reduce toxicity, mobility, or volume through treatment. Alternative No. 3 would remediate (excavate and dispose) the 1,750 yd 3 of fill and debris. Therefore, it would reduce the toxicity and volume of contaminants onsite through removal, not treatment.

Short-Term Effectiveness

Alternative No. 2 best achieves the remediation goals for this site. It will reduce risk to human health within 90 days of signing this ROD and, in addition, it poses no short-term health risk because it does not involve site disturbance.

Alternative No. 3 could pose an increased short-term health risk to onsite construction and maintenance workers and other onsite personnel during earth-moving activities during remediation. These activities have the potential to make subsurface soil available for exposure. These short-term risks would be minimized using standard safety measures.

Implementability

This evaluation criterion addresses the difficulties and unknowns associated with implementing each alternative, including the ability and time necessary to obtain required permits and approvals and the availability of services and materials.

Alternative No. 2 would pose no implementability problems other than those associated with preparing the site plat and a description of the land use restriction, annually inspecting the site, annually certifying compliance, and, in the unlikely event of sale or lease, preparing real property documents that will ensure the site is not used for residential purposes by any person in the future, unless appropriate remediation is first completed.

Excavation of wastes, described in Alternative No. 3, is a straightforward process. Additional sampling and waste characterization would be necessary to determine the boundaries of waste fill to be excavated and the appropriate landfill(s) for disposal. Because of the large volume of waste involved (1,750 yd 3), transportation costs could substantially increase if appropriate landfill facilities with capacity for the waste can only be located at a significant distance from the site.

Cost

Evaluation of costs of each alternative generally includes the calculation of direct and indirect costs, calculated on a present worth basis. The total present worth of Alternative Nos. 2 and 3 has been calculated for comparative purposes and is presented below:

Estimated Cost of Alternatives

Alternative	Total Present Worth Cost
2	$23,250
3	$178,000

Direct capital costs include costs of construction, equipment, building and services, and waste disposal. Indirect capital costs include administrative expenses, engineering expenses, startup and shutdown, and contingency allowances.

MODIFYING CRITERIA

State Acceptance

The Commonwealth of Pennsylvania, represented by the Pennsylvania Department of Environmental Protection (PADEP), concurs with the selected remedy.

Community Acceptance

Community acceptance of the preferred alternative was evaluated after the public comment period, which ended on September 16, 1998. There were no comments from the public on the Proposed Plan. From this, it appears that the public does not oppose the selected remedy.

SELECTED REMEDY

Based on the comparison of the nine evaluation criteria for each of the alternatives in the FFS, the Navy, PADEP, and EPA recommend the use of Alternative No. 2: Institutional Controls. Alternative No. 2 meets the threshold criteria of overall protection to human health and the environment. In considering the balancing criteria, the Navy believes Alternative No. 2 can be readily implemented and minimizes short-term impacts at a reasonable cost. The Navy considers this alternative to be the most appropriate for short- and long-term management to prevent or limit exposure to COPC in subsurface soil. Based on the balance of trade-offs among alternatives and the need to handle potentially contaminated waste fill soil only if excavation or grading is required for future residential development, Alternative No. 2 is also the most practical. Under current and future use conditions, this future residential development scenario is unlikely. NAVICP is an active military installation with no plans for closure in the foreseeable future. In addition, a land use restriction, annual inspection, and certification procedures will, over time, achieve long-term effectiveness and performance.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment given the current industrial land use. There are no ARARs for the selected remedy. Land use

will not change without notice to, and concurrence of, EPA and PADEP. The selected remedy complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action. This remedy is the most cost-effective of the alternatives considered in the FFS. This remedy uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this site. However, because treatment of the principal threats of the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element. Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review of the remedy and its protectiveness will be conducted every 5 years after the commencement of the remedial action.

EXPLANATION OF SIGNIFICANT CHANGES

A Proposed Plan for Site 1 was released for public comment on October 14, 1997. The public comment period was conducted from October 14, 1997 through September 13, 1997 along with a two-session public meeting on October 21, 1997. While preparing the initial ROD, the need to recalculate risks to human health using a larger database became evident. This re-calculation along with comments from the EPA required the Proposed Plan to be re-issued. The second Plan was made available for public comment from August 14, 1998 to September 15, 1998.

RESPONSIVENESS SUMMARY

The selected remedy for Site 1 is the implementation of institutional controls by restricting residential development. No written comments, concerns, or questions were received by the Navy, U.S. EPA, or the Commonwealth of Pennsylvania during the public comment period from August 14, 1998 to September 15, 1998. A public meeting was held on September 2, 1998 to present the Proposed Plan for Site 1 and to answer any questions on the Proposed Plan and on the documents in the information repositories. No questions were asked during the meeting concerning the selected remedy for this site. Based on this, the public has no comment on the selected remedy.

The Pennsylvania Department of Environmental Protection, representing the Commonwealth of Pennsylvania, concurs with the selected remedy.

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Acenaphthene: A semivolatile organic compound used in manufacturing of pharmaceuticals, pesticides and plastics. It is also found in the environment as a result of incomplete combustion of organic matter.

Administrative Record: A body of documents that form the basis for the selection of a CERCLA response action and which demonstrates the public's opportunity to participate and comment on the selection process.

Applicable or Relevant and Appropriate Requirements (ARARs): Related federal and state environmental statutes, laws, or provisions. Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or other limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

Benzene: A volatile organic compound derived from petroleum and one of the principal components of gasoline. It is known to be a toxic compound and human cancer causing agent.

Bis(2-ethy1hexyl)phthaliate: This semi-volatile organic compound is commonly used as a plasticizer and, therefore, is ubiquitous in the environment.

Bromodichloromethane: This volatile organic compound used as a flame retardant and solvent may also occur as a byproduct of the chlorination of water.

Carcinogenic: Causing or inciting cancer.

Chloroform: This volatile organic compound used in anesthetics, pesticides and solvents may also occur as a byproduct of the chlorination of water.

Comprehensive Environmental Response, Compensation, and Liability Act(CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act created a special tax that goes into a Trust Fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Navy compliance with CERCLA/SARA (see IR Program) is funded by the Department of Defense under the Defense Environmental Restoration Fund.

Contaminants of Potential Concern (COPC): Compounds or analytes identified as a possible source of risk based upon a comparison between compound concentrations and established screening levels (e.g., Federal Drinking Water Standards).

Endosulfan: A pesticide used to treat insects on vegetable crops.

Ecological Risk Screening: The qualitative evaluation to assess the risk posed to ecological receptors by the presence, potential presence, and/or use of specific COPC.

Exposure Pathway: A way that a person, plant, or animal may be exposed to a COPC. For example, water may be an exposure pathway for fish.

Feasibility Study (FS): Report that summarizes the development and analysis of remedial alternatives considered for the cleanup of CERCLA sites. Focused Feasibility Studies are for sites with conditions that allow a limited number of alternatives to be considered.

Ground Water: Free water located beneath the ground surface in pores of materials such as sand, soil, gravel, and in cracks or solution features in bedrock. Often serves as a source of drinking water.

Hazard Index (HI): A number indicative of noncarcinogenic health effects which is the ratio of the existing level of exposure to an acceptable level of exposure. A value equal or less than one indicates that the human population is not likely to experience adverse effects.

Hazard Quotient (HQ): The ratio of a single substance exposure level over a specified time period to a reference dose for that substance derived from a similar exposure period.

Human Health Risk Assessment: The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health by the presence or potential presence and/or use of specific COPC.

Inorganic: A compound that is not related to a hydrocarbon or a hydrocarbon-derivative. Often used as a synonym for metals such as arsenic, lead, etc.

Installation Restoration (IR) Program: A component of the Defense Environmental Restoration Program created under CERCLA regulations and funded by the Department of Defense. The purpose of the Program is to identify, assess, characterize, and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills at military activities.

Maximum Contaminant Levels (MCLs): The enforceable primary drinking water standards under the Safe Drinking Water Act (SDWA) with which public water systems must comply.

Naphthalene: This semivolatile organic compound with many industrial and commercial uses also occurs in the environment as a combustion byproduct.

National Priorities List: EPA's list of the most serious uncontrolled or abandoned hazardous waste sites

identified for possible long-term remedial action under CERCLA.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The federal regulation that guides determination of the sites to be corrected under the CERCLA program and the program to prevent or control spills into surface water or other portions of the environment.

Parts per-Billion (ppb): A way of expressing tiny concentrations in air, water, soil, food, or other products. A part per billion is equal to about 1.5 oz of liquid placed into 12,000,000 gal of another liquid.

Pesticides: Substances or mixtures of substances intended for preventing, destroying, repelling, or mitigating any pest, e.g., rats, weeds, or mosquitos.

Polychlorinated Biphenyls (PCB): A group of 209 organic compounds comprised of biphenyl molecules on which two or more chlorine atoms have been attached. PCB were manufactured for many years for use as dielectric fluids in electrical transformers and capacitors due to their stability, low vapor pressure, low flammability, high heat capacity, and low electrical conductivity.

Preliminary Assessment: The process of collecting and reviewing available information about a known or suspected waste site or release.

Record of Decision (ROD): A ROD is a public document which explains the cleanup alternative to be used at a CERCLA site. The ROD is based on technical and financial analyses generated during the RI/FS and on consideration of the public comments and community concerns.

Remedial Investigation (RI): The RI is prepared to report the type, extent, and potential for transport of Contaminants of potential concern at a hazardous waste site, and directs the types of cleanup options that are developed in the FS.

Risk Based Concentrations (RBCs): EPA Region III has developed this list of concentration levels for screening analytical data from CERCLA sites to identify COPC.

Semivolatile Organic Compounds (SVOC): A group of organic compounds composed primarily of carbon and hydrogen that are characterized by their low volatility. SVOC include substances that are contained in hydrocarbon products like asphalt, oil, and tar.

Site Inspection (SI): The collection of information from a property to assess the extent and severity of hazards posed by the property.

Target Analyte List (TAL): A list of inorganic analytes including naturally occurring elements and cyanide which EPA has identified for use in assessing potential hazards at CERCLA sites.

Target Compound List (TCL): A list of organic compounds including VOC, SVOC, pesticides and PCB which EPA has identified for use in assessing potential hazards at CERCLA sites.

Trichloroethene (TCE): A manufactured organic compound typically used as a solvent for degreasing along with other industrial

applications. It is one of the most widely produced and used solvents for industry.

Upgradient: Since water flows from high to low elevation, Upgradient is used to define a location from which ground water is flowing towards a site (i.e. upslope with respect to the water table surface).

Volatilization: Vaporization or evaporation.

Volatile Organic Compounds (VOC): A group of organic compounds composed primarily of carbon and hydrogen that are characterized by their tendency to readily evaporate (or volatize) into the air from water or soil. VOC include substances that are contained in common fuels, solvents, and cleaning fluids.